

listed as rejected on the Office Action Summary. Claims 1, 6-9, 11, 17 and 18 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over King in view of Wang. Claims 4, 5, 10, 12-16, 19 and 20 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over King in view of Wang and further in view of Foley, *Computer Graphics: Principles and Practice, 2nd Edition*. Applicants note with appreciation that the § 101 rejections of claims 18-20 and the § 112 rejections of claims 2, 3 and 18 have been withdrawn. Accordingly, claims 2 and 3 are not subject to rejection, and Applicants therefore respectfully submit that these claims are in condition for allowance. Applicant notes that the drawings filed on July 1, 1999 have not been marked as "accepted" by the Examiner on either the Office Action Summary (PTO-326) of October 3, 2001 or the Office Action Summary of June 4, 2002 and respectfully requests notification of the Examiner's acceptance of the drawings. Applicant also notes that a notice of Draftsperson's Patent Drawing Review (PTO-948) for Formal Drawings filed on February 13, 2002 has not yet been received and respectfully requests a Draftsperson's review.

Rejection of claims 1, 6-9, 11, 17 and 18 under 35 U.S.C. § 103(a)

Claims 1, 6-9, 11, 17 and 18 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over King (U.S. Patent No. 5, 187, 796) in view of Wang (U.S. Patent No. 5,187,796). It is respectfully submitted that these claims are not subject to rejection under 35 U.S.C. § 103(a) for at least the following reasons. First, it would not have been obvious to one skilled in the art to combine King and Wang because there is no apparent suggestion or motivation to combine the references to solve the problem addressed by the Applicant at the time of Applicant's invention. In this regard, Applicant submits that impermissible hindsight was used to improperly combine references. Secondly, the claimed invention is patentably distinct from King and Wang, taken alone or in combination. These reasons are now described in further detail.

"Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination." *In re Fine*, 837 F.2d 1071, 1075, (Fed. Cir. 1988) quoting *ACS*

Hosp. Sys., 732 F.2d 1572, 1577, (Fed. Cir. 1984). King discloses a processor for computing a dot product but does not disclose or suggest the need to calculate cross products. Wang discloses a device which uses an algorithm for calculating a vector cross product (column 12, table 2) but does not disclose or suggest the need to calculate dot products.

Furthermore,

To reach a proper conclusion under § 103, the decisionmaker must step backward in time and into the shoes worn by [a person having ordinary skill in the art] when the invention was unknown and just before it was made. In light of *all* the evidence, the decisionmaker must then determine whether ... the claimed invention as a whole would have been obvious at *that* time to *that* person.

In re Fine, 837 F.2d at 1073-4.

The Official Action states that it would have been obvious to combine the inventions of Wang and King “because there *are* many fields in the computer art[s], such as graphics and simulation, where dot product and cross product operations are used extensively.” (Official Action, page 9, emphasis added). Applicant does not dispute that presently, use of both dot product and cross products in 3D graphics have become more common, however, at the time of Applicant’s invention, this was not the case, as evidenced by the following sentence from Applicant’s Specification:

Conventional lighting models typically model one or more lighting effects such as diffuse reflection, specular reflection, and spotlighting, each of which is *typically determined by evaluating a dot product* of two vectors.

(Specification as originally filed, page 1, lines 8-10, emphasis added.) “The diffuse light fall-off in the diffuse reflection model is typically modeled by using a dot product term $N \bullet L$.” (Specification, page 2, lines 15-16). “In practice, a dot product term $(N \bullet H)^s$ is often used ...to model specular reflection.” (Specification, page 2, lines 22-23). “... a spotlight is typically computed in accordance with a spotlight equation... $(S \bullet L)^{exp}$.” (Specification, page 7-9). Hence *at the time of Applicant’s invention*, it would *not* have been obvious to combine King and Wang, because dot products were typically used to model these types of lighting.

Applicant submits, therefore, that King and Wang were improperly combined using hindsight reconstruction, using Applicant's claims to pick and choose among the prior art. See *In re Gorman*, 933 F.2d 982 (Fed. Cir. 1991) (noting where it was necessary to select elements of various teachings that "[I]t is impermissible, however, simply to engage in hindsight reconstruction of the claimed invention, using the applicant's structure as a template and selecting elements from references to fill the gaps.) See *In re Vaeck*, 947 f.2d 488 (Fed. Cir. 1991); see also MPEP 2143. Here, the Examiners stated motivation to combine the references is that "there are many fields in the computer art[s], such as graphics and simulation, where dot product and cross product operations are used extensively." Notably, the Examiner has not pointed out a suggestion to combine found in the references themselves but has merely indicated that the combination would be advantageous. Hence, Applicant respectfully requests the withdrawal of the § 103 rejections of claims 1, 6-9, 11, 17 and 18.

Secondly, neither King nor Wang disclose or suggest "evaluating a cross product component or a dot product in response to a first signal" as recited by Applicant's claim 1, analogous features being recited in claims 11 and 18. Thus, the combination of King and Wang fails to teach Applicants' invention as explicitly recited in the claims.

The Official Action acknowledges that neither Wang nor King disclose or suggest use of a signal indicating whether to generate a cross or dot product but asserts that such a signal "would have been obvious to one of ordinary skill in the art at the time of the invention, because a device that combined the features of Wang and King would by necessity require some means to indicate which function to use at any given time." Applicants submit that, even assuming King and Wang were combined, it would not have been obvious to "evaluat[e] a cross product component or a dot product in response to a first signal" as recited by Applicant's claims.

A similar situation occurred in *In re Fine*, in which the U.S. Court of Appeals overturned the Board of Patent Appeals' affirmed rejection of Fine's claims because the claims "were rejected because the PTO thought it would have been 'obvious to

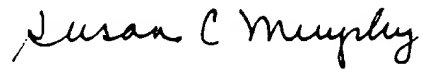
try' the claimed invention, an unacceptable basis for rejection." *In re Fine*, 837 F.2d at 1074. Applicant submits that determining whether a dot product or a cross product should be evaluated could be accomplished in a host of different ways, including, for example, having a routine estimate the processing required for calculating a dot product versus a cross product and determine which to calculation to initiate based on the estimate, arbitrarily determining that all spotlighting calculations would be determined by using the dot product calculation, and so on. Hence, Applicant submits that use of a signal to determine whether a dot product or cross product is calculated is not obvious and respectfully requests withdrawal of the 103(a) rejections of claim 1, 7, 8, 9, 11, 17 and 18.

Rejection of claims 4, 5, 10, 12-16, 19 and 20 under 35 U.S.C. § 103(a)

Claims 4, 5, 10, 12-16, 19 and 20 have been rejected under 35 U.S.C. §103(a) as being unpatentable over King (U.S. Patent No. 5,187,796) in view of Wang (U.S. Patent No. 5,187,796) and Foley, *Computer Graphics: Principles and Practice, 2nd Edition*. It is respectfully submitted that these claims are patentable because neither Wang nor King nor Foley teach or suggest "receiving ... a first signal indicating whether to generate a cross product or a dot product" as appears in Applicant's independent claims 1, 11 and 18, from which claims 4, 5, 10, 12, 13, 14, 15, 16, 19 and 20 depend for the reasons cited above. Hence, Applicant respectfully requests withdrawal of the §103 rejections of claims 4, 5, 10, 12-16, 19 and 20.

In view of the above remarks, Applicant respectfully submits that the present application is in condition for allowance. Reconsideration of the application and an early Notice of Allowance are respectfully requested.

Respectfully submitted,



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